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| 10/566,813      | 01/30/2006  | David Casey          | 0789860222          | 8053             |

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| EXAMINER |
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LEE, JAE

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| ART UNIT | PAPER NUMBER |
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2895

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08/03/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/566,813 | <b>Applicant(s)</b><br>CASEY, DAVID |  |
|                              | <b>Examiner</b><br>JAE LEE           | <b>Art Unit</b><br>2895             |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5,7,8 and 10-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7,8 and 10-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 05/20/2010 have been fully considered but they are not persuasive.

With regards to arguments presented pertaining to claim 1, examiner submits that the claim does not recite how an increase in metal thickness would provide these benefits. Rather, the claim merely recites the specific area resistance and a thickness of a metal layer which, when read upon its literal meaning, does not claim how the method of increasing the thickness of the metal layer would provide the alleged benefits presented by applicant. The same rationale is also applied to dependent claims 2 and 3 which also claim specific thicknesses of metal layers instead of the method of increasing the thickness.

Even assuming *arguendo* that the increase of metal layer yields surprising benefits, the alleged surprising benefits claimed by the applicant are naturally occurring phenomenon within bipolar junction transistors. The prior art discloses the same structure as claimed and when used in combination with secondary reference Gardes et al., increases of metal layer will naturally yield the claimed discoveries.

The examiner also submits Gardes et al. to further reinforce the position that a clear teaching, suggestion, or motivation is produced when increasing the thickness of the metal layers. Therefore, one of ordinary skill would most likely be inclined to adopt Garde's motivation of increasing the thickness of the metal layer for the contact since this "will result in decreases in series resistance as well as a small voltage drop".

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Whether small or large, the motivation is clearly disclosed and one of ordinary skill would most likely incorporate this into his/her device. Because of this incorporation, the surprising results alleged by the applicant would come naturally.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 1, 2, 3, 5, 7, 8, 12, and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto (Pub No. US 2002/0024114 A1, hereinafter Sakamoto).

With regards to **claim 1**, Sakamoto teaches a bipolar transistor suitable for operation as a saturated switch comprising:

a first semiconductor region of a first conductivity type defining a collector region (see Fig. 1a, n collector region **21**);

a second semiconductor region of a second conductivity type defining a base region (see Fig. 1a, p base region **22**);

a third semiconductor region of said first conductivity type defining an emitter region (see Fig. 1a, n emitter region **24**); and

a metal layer providing contacts to said base and emitter regions (see Fig. 1a, metal layer **26+27** provided);

wherein the emitter region defines a first surface, the base region extending to said surface in locations defined by apertures through emitter region, said metal layer overlying said first surface (see Fig. 1a, emitter region **24** with first surface, base region extended through apertures through emitter region, metal layer from **26+27**),

wherein the bipolar transistor has a specific area resistance less than 500mOhms.mm<sup>2</sup> (see Remarks dated 10/19/2009, page 7, second paragraph, with the matrix design, possible to attain specific area resistance less than 500 mOhms.mm<sup>2</sup>);

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Sakamoto, however, does not teach the thickness of said metal layer is greater than 3 microns.

It would have been obvious to one of ordinary skill to determine the optimum thickness (see *In re Aller, Lacey, and Hall* (10 USPQ 233-237)). It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom, but instead, discloses the METHOD criticality of yielding the benefit (i.e. gradually increasing thickness will generate lower voltage drops). In essence, the mere disclosure of a thickness does not disclose this method criticality (i.e. its simply a thickness). Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical (see *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990)).

With regards to **claim 2**, Sakamoto does not teach a bipolar transistor according to **claim 1**, wherein the thickness of the metal layer is no less than 4 microns

It would have been obvious to one of ordinary skill to determine the optimum thickness (see *In re Aller, Lacey, and Hall* (10 USPQ 233-237)). It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom, but instead, discloses the METHOD criticality of yielding the benefit (i.e. gradually increasing thickness will generate lower voltage

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drops). In essence, the mere disclosure of a thickness does not disclose this method criticality (i.e. its simply a thickness). Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical (see *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990)).

With regards to **claims 3 and 14**, Sakamoto does not teach a bipolar transistor according to any preceding claim, wherein the thickness of the metal layer is no less than 6 microns.

It would have been obvious to one of ordinary skill to determine the optimum thickness (see *In re Aller, Lacey, and Hall* (10 USPQ 233-237)). It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom, but instead, discloses the METHOD criticality of yielding the benefit (i.e. gradually increasing thickness will generate lower voltage drops). In essence, the mere disclosure of a thickness does not disclose this method criticality (i.e. its simply a thickness). Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical (see *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990)).

With regards to **claims 5, 12, and 13**, Sakamoto does not teach a bipolar transistor according to any preceding claim, wherein the adjacent apertures are spaced less than 100 microns from each other.

It would have been obvious to one of ordinary skill to determine the optimum spacing of apertures (see *In re Aller, Lacey, and Hall* (10 USPQ 233-237). It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom, but instead, discloses the METHOD criticality of yielding the benefit (i.e. gradually increasing thickness will generate lower voltage drops). In essence, the mere disclosure of a thickness does not disclose this method criticality (i.e. its simply a thickness). Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical (see *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990)).

With regards to **claim 7**, Sakamoto teaches the bipolar transistor according to **claim 1**, wherein an increase in the thickness of the metal layer corresponds to a reduction in the voltage drop in the contacts to said base and emitter regions (this is a natural phenomenon that would happen inherently in nature; almost equivalent to a mathematical relationship; nevertheless, if this is a natural phenomenon, this will happen inherently).



With regards to **claim 8**, Sakamoto teaches the bipolar transistor according to claim 7, wherein the reduction in the voltage drop in the contacts is proportional to the increase in the thickness of the metal layer (this is a natural phenomenon that would happen inherently in nature; almost equivalent to a mathematical relationship).

5. **Claims 10 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto and further in view of Gardes et al. (Pub No. US 2003/0066184 A1, hereinafter Gardes et al.).

With regards to **claim 10**, Sakamoto teaches a method of manufacturing a bipolar transistor, the method comprising:

providing a bipolar transistor including a base region, an emitter region and a metal layer providing contacts to the base region and the emitter region, the bipolar transistor having a specific area resistance of less than 500 mOhms.mm<sup>2</sup> (see Fig. 1a, base, emitter, and metal layer providing metal contacts shown, see Remarks dated 10/19/2009, page 7, second paragraph, with the matrix design, possible to attain specific area resistance less than 500 mOhms.mm<sup>2</sup>);

Sakamoto, however, does not teach the metal layer having a 3 micron thickness and then subsequently increasing the thickness to a thickness greater than 3 microns.

It would have been obvious to one of ordinary skill to determine the optimum initial thickness (see *In re Aller, Lacey, and Hall* (10 USPQ 233-237). It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or

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any unexpected results arising therefrom, but instead, discloses the METHOD criticality of yielding the benefit (i.e. gradually increasing thickness will generate lower voltage drops). In essence, the mere disclosure of a thickness does not disclose this method criticality (i.e. its simply a thickness). Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical (see *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990)).

Also, in the same field of endeavor, Gardes et al. teaches how an increasing thickness of a metal layer will result in decreases in series resistance as well as a small voltage drop (see Fig. 1, ¶33).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to acknowledge that an increase of the metal layer for the contacts will result in decreases in series resistance as well as a small voltage drop as taught by Gardes et al.

With regards to **claim 11**, Sakamoto teaches the method according to **claim 10** wherein increasing the thickness of the metal layer to be greater than 3 microns comprises increasing the thickness of the metal layer to be no less than 4 microns.

In the same field of endeavor, Gardes et al. teaches how an increasing thickness of a metal layer will result in decreases in series resistance as well as a small voltage drop (see Fig. 1, ¶33).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to acknowledge that an increase of the metal layer for the contacts will result in decreases in series resistance as well as a small voltage drop as taught by Gardes et al.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAE LEE whose telephone number is (571)270-1224. The examiner can normally be reached on Monday - Friday, 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards can be reached on 571-272-1736. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jae Lee/  
Examiner, Art Unit 2895

JML

/N. Drew Richards/  
Supervisory Patent Examiner, Art Unit 2895